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The International Journal of Orthodontia

Editor: Martin Dewey, D.D.S., M.D.

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ORIGINAL ARTICLES

THE ETIOLOGY AND TREATMENT OF SOME TYPES OF DEFLECTED NASAL SEPTUM.

BY MARTIN DEWEY, D.D.S., M.D., KANSAS CITY, MO.

DEFORMITIES of the nasal septum have been known for a great many years and much has been written regarding the etiology of these conditions, but at the present time many investigators differ as to the real cause of these deflections. The probable cause for this difference of opinion lies in the fact that many of these investigations were carried on from different standpoints. Not only do we have deformities of the nasal septum, which is a cartilaginous and bony partition separating the nasal fossa into the right and left half, but we also have deformities of the lateral walls of the nose and deformities of the turbinated bodies.

In order to understand the deformities which may occur in the septum, it is well to be familiar with the structures which enter into the formation of this part of the nasal apparatus. The nasal septum, for the purpose of description, may be divided into three parts (Fig 1), two of the parts being osseous structure and one cartilaginous. The nasal septum is derived from three parts which are, first, the perpendicular plate of the ethmoid, which grows down in the base of the chondrocranium, forming approximately about one-third of the nasal septum. This perpendicular plate of the ethmoid is laid down in the cartilage, and is developed by endochondral bone formation. The other bony portion of the nasal septum is the vomer, which lays posterior and inferior to the perpendicular plate of the ethmoid; the base of the vomer resting on the body of the sphenoid bone, projecting downward and forward, articulating with the crest of the superior maxillary in the median line. The remaining anterior portion of the nasal septum is cartilaginous, and is named the triangular cartilage from its shape. The triangular cartilage, developing in cartilage, and the remaining, a cartilaginous structure during the life of the individual, occupies a position anterior and between the perpendicular plate of the ethmoid and the vomer. The anterior superior portion of the triangular cartilage comes in contact with the crest of the nasal bones,

and helps support the bridge of the nose. The posterior border of the triangular cartilage is triangular-shaped, and extends in between the triangular space at the junction of the vomer and ethmoid, and in some cases this triangular portion of the triangular cartilage extends posterior for a considerable distance, so that spurs located at the junction of the perpendicular plate of the ethmoid and the vomer may contain cartilage. The nasal septum is then composed of these three parts, two of which are bone and one cartilage.

We find that the perpendicular plate of the ethmoid is developed in cartilage and calcified from cartilage. The vomer was originally laid down in cartilage, but a membrane develops on both sides of the cartilage which formed a bony plate and the cartilaginous portion disappeared, leaving the vomer really a double bone made up of a right and left half, which can be seen in Fig. 2. It will be noticed in this specimen, which has been cut through the nasal septum from above downward so as to afford a view of the greater portion of the vomer, that the tendency is for the nasal septum to separate, which often occurs in this portion of the structure.

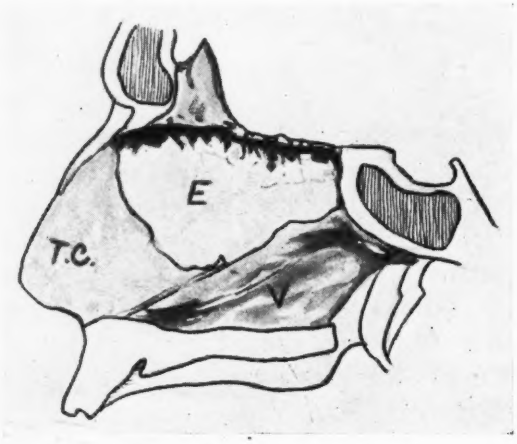

Fig. 1—Diagram of nasal septum. *T.C.*, Triangular cartilage; *E.*, Perpendicular plate of ethmoid; *V.*, Vomer.

If a sagittal section of a skull is made the following structures may be noticed; first, an inferior or arrow-shaped bony portion apparently growing upward in a perichondrium in two layers which gradually absorbs the intervening ethmovomerine cartilage and becomes the vomer; second, there will be noticed a superior and somewhat quadrilateral-shaped area composed of hyaline cartilage. Just behind its center, a white bony nodule will be seen which, gradually spreading, forms the perpendicular plate of the ethmoid, leaving, however, a large anterior portion entirely free from ossification, which is the permanent cartilaginous septum. Thus it will be seen that the permanent septum, as we have already mentioned, began to develop very early from three distinct parts, and remains through life as two bony and one cartilaginous portions. We must remember this fact because the structure of the septum has a great deal to do with deformities which develop later on. One of the bony portions, the vomer, as we have said, is formed of two laminae in membrane. This is a fact which is not very well known (or least considered) by men engaged in the practice of orthodontia, and even overlooked

by some medical men. The fact that the vomer develops from two laminae is responsible for a great many of the types of deformities and nasal spurs which are developed in later life. The ethmoid, of course, is formed from the chondrocranium as a single layer in cartilage and ossifies in that manner. The rest of the septum, the triangular portion, of course remains and is cartilaginous through life.

It must be obvious to any one that with such a complicated structure as a single organ occupying the position the nasal septum does, developed from three separate sources, and in three different manners made up of three distinct parts; that it would be very easy for pathological conditions to occur or

Fig. 2.—Showing double plates of nasal septum.

for conditions to develop which would produce deformity of the nasal septum. The nasal septum is particularly liable to the formation of spurs and deviations, and these spurs and deviations may be trophic or traumatic in their origin. The formation of these spurs is further complicated by the tendency for the supervomerine portion of the triangular cartilage to presist, extending backwards between the perpendicular plate of the ethmoid and the vomer, and entering into the formation of cartilaginous spurs in that remote location. The location of the nasal septum also renders it liable to a great many traumatic deformities, because it is surrounded and enclosed practically with a bony cavity. The septum may be said to grow downward from the base of the cranium arising from the anterior portion of the frontal bone, horizontal

plate of the ethmoid, and the body of the sphenoid. The anterior portion of the triangular cartilage is also supported by the crest of the nasal bones. The lower border of the nasal septum is the crest of the superior maxillary and palate. By examining Figs. 1, 2 and 3, you will see that the nasal septum in the adult is enclosed within bony walls and necessarily its development must depend a great deal upon the development and growth which occurs in the parts surrounding it. In other words, if anything should interfere with the development of the bones making up the nasal fossa, the nasal septum would necessarily suffer, even though it is not directly at fault.

This forces upon us the consideration of the development of the parts associated with the nasal septum and of the development of the nasal septum itself. We have already called attention to the fact that the developed nasal

Fig. 3.—Posterior view of nasal cavity showing bony cavity which contains the nasal septum.

septum consists of three separate and distinct portions, the ethmoidal portion, the vomer, and the triangular cartilage. The vomer has been evolved from a bone, which in lower animals is much larger, and which occupies a more important position than that of dividing the nasal cavity into right and left halves. In the lower animals we find the vomer projects downward from the base of the cranium, is of considerable size, and is often a tooth-bearing structure. In man, we find the vomer decidedly small, and its principal function seems to be a source of annoyance to those who are so unfortunate as to have nasal cavities which are not the proper size. The vomer is of very early origin in the evolution of the face, and is one of the first structures developed in the region of the nose. In fact, originally it was not derived or formed as a nasal organ, but was a dental organ bearing teeth. It has,

therefore, lost its dental functions in man and become aborted to a certain extent, but still persists in developing, and even insists upon developing to a certain size, regardless of what else occurs in that particular region.

In order to understand the position of the nasal septum and especially with reference to the vomer, we must remember that at one time the nasal and oral cavity was a common structure, known as the stomodeum, and the roof of the mouth had not yet developed. Fig. 4 is a drawing of the roof of the oral cavity of the human embryo with fundaments of the palatine pro-

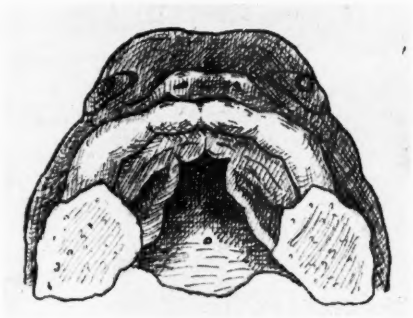

Fig. 4

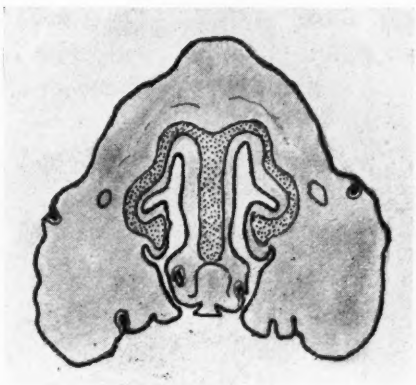

Fig. 5

Fig. 4.—Drawing showing embryonic development of roof of mouth.
Fig. 5.—Cross-section of developing nasal and oral cavity of embryo pig. (After His.)

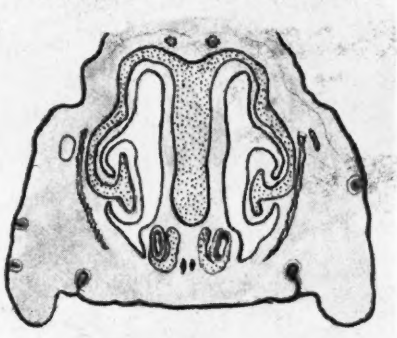

Fig. 6.—Cross-section of developing nasal cavity after the union of the palatal processes of the superior maxillae. (After His.)

cess showing, made after His. The alveolar, or dental ridge containing tooth germs can be seen, and a horizontal outgrowth is shown on the right and left side, approaching the median line. The roof of the mouth has not yet united, and at this time, growing down from the base of the chondrocranium would be the vomer, which in early life and in lower animals projects down between the two right and left halves of the superior maxillary. In the human being, the right and left halves of the superior maxillary, or the palatine process of the superior maxillary, seem to approach each other after the manner shown in Fig. 5, which is a drawing made from the cross-section of an embryo pig about the time of the union of the right and left halves of the superior maxillary. This section is made through the ethmoid, and shows very little of the vomer; the perpendicular plate and lateral masses of the

ethmoid, developed in cartilage, is shown by the dotted, shaded area. However, the position of the nasal septum between the right and left halves of the superior maxillary is shown, and it also shows that the nasal septum is derived from the tissues above the floor of the nose, and grows from above downward. In other words, the nasal septum takes a position regardless of the development of the right and left halves of the superior maxillary and regardless of the union of the maxillary bone in the median line. Fig. 6 is a drawing of an embryo pig, taken later in life, which shows the union of the superior maxillary bone and the nasal septum now enclosed entirely in the nasal cavity. The septum has developed from above downward, the cartilaginous portion of the ethmoid, both in the perpendicular plate and the lateral masses, can be seen, and likewise calcification of the bone in the lateral

Fig. 7.—Nasal septum enclosed in nasal cavity.

wall of the nose or the superior maxillary. This now gives us the nasal cavity entirely surrounded by mesoblastic tissue which will later calcify into true bone.

As the development of the nasal septum proceeds, we find it is entirely enclosed with the nasal fossa, and Fig. 7 shows the condition which exists at first. In order to understand the growth of the nasal fossa and particularly the growth of the nasal septum, it will be necessary to observe a few anatomical points in the entire development of the face at this time. It will be observed, in studying Fig. 7, that the cranium is a much larger portion of the skull. The face is very little developed, and the oral cavity is much larger than the entire remaining portion of the face. The floor of the mouth is very close to the floor of the orbits. The alveolar ridge, or the ridge of

the superior maxillary, is very close to the floor of the orbit and also to the floor of the nose. In this section, the middle and inferior turbinates are shown, and it will be observed that they are practically in contact with the floor of the nose. In studying the nasal fossa of the adult, shown in Fig. 8, it will be observed that there has been a great lengthening of the face and the alveolar border, or the floor of the mouth. The nasal cavity has also greatly increased in length, especially in that region corresponding with the inferior

Fig. 8.—Nasal cavity of an adult.

meatus. It will be seen that the inferior turbinates now lie a considerable distance above the floor of the nose. In this growth of the nasal cavity, it has practically been proven by a careful study of the anatomical parts that the floor of the nose has grown downward and that the inferior turbinates have not traveled upward. With this downward growth of the floor of the nose, the nasal septum has been greatly lengthened or increased in length. The reader's attention has already been called to the fact that the nasal septum is developed from structures which primarily were not concerned in

the function of respiration. During the process of evolution, these parts—the vomer, the perpendicular plate of the ethmoid, and the triangular cartilage, have been enclosed in a bony cavity which is made up principally by the superior maxillary bone, the horizontal plate of the ethmoid, the body of the sphenoid, and the palate. This bony box, which makes the outline of the nasal cavity, and which includes the nasal septum, is shown in Fig. 8. A great many deflected septums are caused by inharmonious developments existing between the septum itself and the bony box in which it is enclosed.

Attention has already been called to the fact that the deviations of the septum are divided into tropic and traumatic. In considering further the development of the nasal septum, it must be remembered that at first the floor of the nostril is not rigid, for the sutures between the several elements—palate, maxillary, and the premaxillary are quite wide and filled in with a more or less flexible tissue, upon which the tip of the vomer rests, and which allows

Fig. 9.—Superior maxillae showing bony cavity which contains nasal septum.

more or less uniform growth of all parts. The growth of these parts is not responsible for or the result of the same condition in all cases; that is, conditions which affect the development of the superior maxillary and premaxillary bones do not necessarily influence or retard the development of the vomer and the parts forming the nasal septum. These faulty development, or lack of development, has long been recognized, for Brown states that if there should be solidification of the sutures too soon, it will materially interfere with the growth of the septum, causing it to be deflected or crumpled. Poticuet believes that this defect of harmony between the development of the septum and its environments is the chief cause of nasal deviations. He also describes a pair of bones—subvomerine, which, placed between the intermaxillary bone, form a buttress to receive the anterior end of the vomer, and should they develop irregularly, spurs will result.

The question of spurs and the question of deflected septums are really

two different things, for by a deflected septum we refer more particularly to a bending or curvature of the septum, while a septal spur is a thickening or projection on one or the other side of the septum, or it may be a thickening located on both sides. Septal spurs are very often the result of some traumatic injury, such as a blow on the end of the triangular cartilage, which may displace the supravomerine end of the triangular cartilage and result in a spur at that location. It may also result in the separation of the two plates

Fig. 10.—Showing nasal septum bent from before backward.

of the vomer, which will allow the osteoblasts to escape into the space and form a calcification, or a spur, which, of course, will become permanent. The result of an injury may also displace the end of the triangular cartilage, or the tip end of the vomer where it rests on the nasal crest of the superior maxillary, making a septal spur on the anterior portion of the septum. These septal spurs have to be removed by surgical operation after they are once formed as the result of injuries, which allowed the escape of osteoblasts, for they remain as a permanent condition, which has developed as a result of the

injured septum and not the result of tropic conditions occurring in the bony environment surrounding the nasal septum. We mention this, for it is well to remember that all cases of deflected septums, or deformed septums, are not the result of faulty development of the superior maxillary and palate bones.

Another factor which must be remembered in the consideration of deflected nasal septums, is that there are two kinds of deflected septums. We have deflected septums which occur from above downward, and also those which occur from before backwards. The deflection occurring from before

Fig. 11.—Top section of Fig. 10 showing curved nasal septum.

backwards is in the majority of cases the result of some injury or the lack of development of the premaxillary region of the superior maxillary bone. If there is a failure of development in the premaxillary region so as to retard or interfere with the forward growth of the tip of the vomer, the septum will become bunched or bent in the anterior portion. It will also be bunched or bent in the anterior inferior portion. If seen early in life, this bending of the septum can be overcome by proper orthodontic treatment, which will consist in moving the incisors forward, thereby producing a development of the premaxillary bones and allowing the anterior end of the vomer to assume its

proper position. This type of septal deflection was described by Dr. H. P. Mosher, of Boston, in a paper read before the American Society of Orthodontists some few years ago.

In considering the arrangements of the nasal septum from before backwards, by referring to Fig. 10 you will see that the septum extends from the base of the sphenoid bone forward to the tip of the nasal spine of the superior maxillary. At the posterior portion of the nasal septum, shown in Fig. 10, you will see a tendency for the parts to separate, which are the two halves of the vomer. About the middle half, the septum assumes a single appearance, which portion is the triangular cartilage of the nasal septum. The nasal

Fig. 12.—Perpendicular section of skull showing normal nasal septum.

septum shown in this picture is one which is curved, from before backwards, probably bent as the result of traumatic injury. The cartilaginous portion is bent in one direction, while the vomerine is bent in the other. Fig. 11 shows the upper half of the same specimen, and you will observe in connection with the deflected septum there is also hypertrophy and atrophy of the turbinates. Now such a deflection of the nasal septum as we have here would probably be benefited very little by orthodontic treatment, although it may be possible in some cases that an expansion of the dental arch would improve a similar condition, but in this case such would not be true, for this individual possessed a normal set of teeth with normal occlusion. In fact, the teeth, from the standpoint of occlusion and perfection of development, are superior to

anything we have ever seen before. So in this particular case the deflected septum has no doubt been the result of injury, for in other respects the nasal cavity is beautifully developed. The maxillary sinuses are large, and there is nothing to indicate that trophic conditions have had anything to do with this deflection. In fact, we show you this case and mention this fact to impress upon your mind that you must not state that all cases of deflected nasal septums are the result of malocclusion, or that the correction of malocclusion is going to correct all the deflected nasal septums.

Fig. 13.—Left side of skull shown in Fig. 12. Nasal cavity normal.

Fig. 12 is made from another section of a skull, which possessed, at one time, a normal dental apparatus, although the individual had lost several teeth by extraction, but the dental apparatus and nasal fossa were normally developed. The individual had also been fortunate enough to avoid injury to the triangular cartilage, probably had never been of a combative turn of mind, and therefore, the nasal septum is normal. By comparing this picture with the drawing shown in Fig. 1, you will get some idea of the relation of the parts. The frontal and sphenoidal sinuses are shown very beautifully and the outline of the perpendicular plate of the ethmoid and vomer is also clearly shown. Fig. 13 shows the other half of the nasal fossa and the location and position of the superior, middle, and inferior turbinates. Comparing this structure with the septum of the child at birth, it will be seen that the nasal

cavity has greatly lengthened, and by this lengthening of the nasal cavity it has been possible for the septum, as shown in Fig. 12, to remain straight.

In the majority of nasal septums deflected from above downward, this deflection is the result of improper development of the superior maxillary and palate bones. Some condition arises which interferes with the development of the superior maxillary bone, and the superior maxillary being a bone of environment becomes underdeveloped. The nasal septum having a different source of development, namely, arising from the chrondocranium, has a different embryonic origin than the superior maxillary bones which arise from the visceral skeleton. The parts derived from the visceral skeleton are much more recent than those which are derived from chrondocranium. A law in biology is that the parts which develop first are more constant than those of recent origin; or, in other words, the parts which develop last change first. Therefore, we would expect conditions to affect the superior maxillary bone which would exert no influence on the nasal septum. Consequently, the proper treatment of deflected nasal septums which bend from above downward generally lies with the orthodontist rather than with the rhinologist. We believe that a badly contracted superior arch will be found in the majority of cases of deflected nasal septums from above downward. Superior maxillary bones will have failed to grow downward, resulting in an underdeveloped dental arch. The superior maxillary bones have not developed properly in the lateral direction. The roof of the mouth will not be low enough, and as a result the septum growing from above downward meets with obstruction at the lower border and consequently is deflected. Of course, in order to improve the deflected septum, the orthodontic treatment must be undertaken at quite an early age in life, although improvement of the deflected septum is possible at twelve and fourteen years of age, and I have even known a benefit to occur at twenty. I believe that in ninety per cent of the cases where the nasal septum is deflected from above downward the greatest improvement can be accomplished by orthodontic treatment.

Results which are very remarkable and almost unbelievable to some men have been accomplished, but I will simply sight one case as treated by Dr. A. H. Ketcham to show what can be accomplished in this respect. I could mention a great many from my own practice, but prefer to give you one from the practice of some other man, so as to show you that these results are by no means limited to any one particular man's skill. In a paper read before the Southern Branch of the National Dental Association at Houston, Texas, May 4th, 1910, and published in the *Dental Cosmos*, Dr. Ketcham reports the following condition: "The patient presented himself at 14 years of age with a badly contracted upper arch. When the treatment was begun, the boy could not walk upstairs, ride a bicycle, or run without breathing through his mouth. His rhinologist, Dr. T. E. Carmody, reported that the nasal space was about one-half normal, and the septum was deflected. The condition of the under side of the thin plate separating the oral from the nasal cavity was fully as bad. The distance between the upper second bicuspid and the gingival line was about seventy-three one-hundredths of an inch. All the upper teeth, with the exception of the canines and the second molars, were in lingual position in relation to the line of occlusion, while the teeth in the lower arch were in distal occlusion, and quite irregular. Expansion was decided

upon without a moment's hesitation. All the teeth were placed in harmony with the line of occlusion, the lowers being moved forward until the mesio-distal relation of the two arches was normal. The tooth movement was completed in about eight months' time. The boy did not suffer, but gained in weight and health during the operation, and was in the best of spirits, as an instance will show. One day he came to the office with his face flushed and covered with perspiration. Upon questioning the boy, the doctor found that he was feeling so good over his improved breathing, that he had run the entire distance from his home to the office, about two miles, and kept his mouth closed, breathing entirely through his nose. Shortly before the retaining appliances were placed upon the teeth, he went again to his rhinologist for examination, who reported that the nasal space had increased in size until it was as near as he could judge, seven-eighths normal, and the deflected septum had been nearly straightened. All this was accomplished by expanding the upper arch fifty-one one-hundredths of an inch. Dr. Carmody, the rhinologist, later giving an explanation of this case made the following report. The nasal space, March 10th, 1906, before orthodontic treatment, one-half normal, deflected septum, slight adenoid tissue present. After treatment, December, 1906, space about seven-eights normal, septum almost completely straightened. April, 1910, three and one-half years after orthodontia treatment, he reports: nasal space fully normal, no deflected septum." A great many more of these results could be reported, and they can be taken from the records of our leading practitioners, but it is useless to give a greater number.

In making a resume in regard to deflected septums, it must be remembered that deflected septums are of two varieties—first, traumatic and trophic. Deflected septums which are the result of injury cannot be benefited by orthodontic treatment. Deflected septums resulting from faulty development may be divided into cases produced by a lack of development of the premaxillary bone, which deflection is located principaIly in the anterior inferior portion of the nasal septum. These can be benefited by expansion of the arch, especially in the incisal region. Another group of deflected septums resulting from faulty development of the superior maxillary bone causes a narrow nasal cavity and one too short from above downward, resulting in insufficient room for the septum from above downward, thereby producing a deflected septum which may assume a double curvature like the letter S, or simply curved in one direction. The expansion of the dental arch during the growing period, anywhere from eight to sixteen years, can be expected to give the best results obtainable in this class of cases. The reason the septum continues to grow, regardless of the development of the superior maxillary bone, is found in the embryonic origin of the parts and the complicated structures which enter into it. Therefore, I would caution the orthodontist to make a careful diagnosis between the different kinds of deflected septums before he promise the patient or the rhinologist that orthodontic treatment will do any good. To the rhinologist, I would say that he make a more careful examination of the oral cavity and feel convinced that the deflected septum is the result of traumatic injury before he operate, and if the deflected septum is the result of the lack of growth of the superior maxillary, he will do his patient a greater good by referring him for orthodontic treatment than by insisting upon an immediate operation.

THE HISTORY OF ORTHODONTIA.

(*Continued from page* 534)

By Bernhard Wolf Weinberger, D.D.S.
New York City.

Etruscan Dentistry.

NAVIGATION between the Phœnicians, Egyptians and the inhabitants of Italy having been established, the merchants and traders of these countries were brought into constant contact with each other. Considerable advancement resulted from this natural intercourse, and a high degree of civilization and great skill in the decorative and other arts was thus attained by the Etruscans.

The various and numerous dental appliances found in the tombs of the Etruscans, and now preserved in different Italian museums, prove that dentistry profited by this constant interchange, and that those people achieved great results and successes in the dental art. From the tomb at Civita Castellana, the ancient Falerii, was excavated an appliance which now is kept in the museum of Pope Julius (Fig. 1). This consists of a series of four gold bands meant to encircle the canine, bicuspids and first molar. The third band is crossed by a pivot riveted at its two extremities, and designed presumably to hold in place an artificial tooth, now missing. This appliance illustrates their skill and beautiful work in mechanical art.

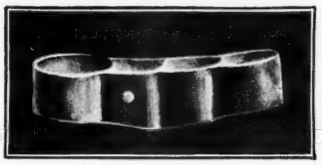

Fig. 1.

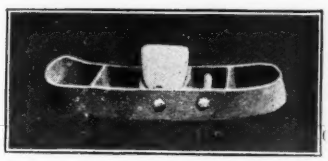

Fig. 3.

Fig. 1.—Etruscan artificial gold appliance found at Valsiarosa, for an artificial bicuspid, now missing.
Fig. 3.—Ancient Etruscan dental appliance for supporting two inserted human teeth, one of which is now missing.

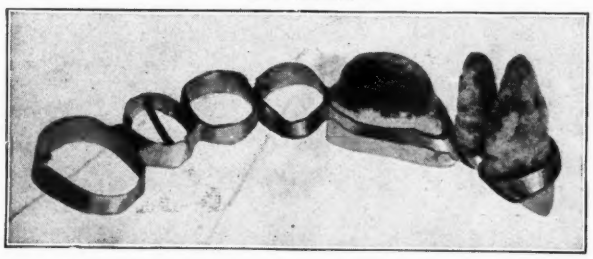

Fig. 2.—Artificial denture (Etruscan) for supporting three teeth, two of which were made of one ox-tooth.

A still more interesting specimen of Etruscan dental art is now in the Civic Museum of Corneto (Figs. 2 and 3). This was found in one of the most ancient tombs of the necropolis of Tarquinni and consists of three teeth, two upper central incisors, and the second premolar on the left, which is, however, missing. This "bridge" extends from the right upper canine to the left first molar. To support these teeth the Etruscan dentist made use of the canine and lateral incisor on the right; the canine, premolars and first molar on the left, joining them by a continuous series of bands or pure

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gold rings, soldered together. The central incisors are replaced by a large ox tooth grooved in the center to give the appearance of the two missing teeth. This large tooth is held in place by two pivots riveted to the gold band encircling it.

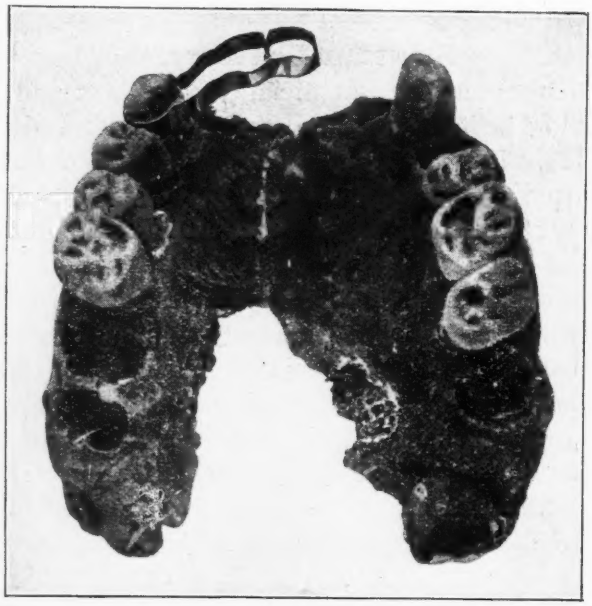

Fig. 4.—Ancient dental appliance still adhering to the jaw, discovered in an Etruscan necropolis near Orvieto, and now in Ghent University.

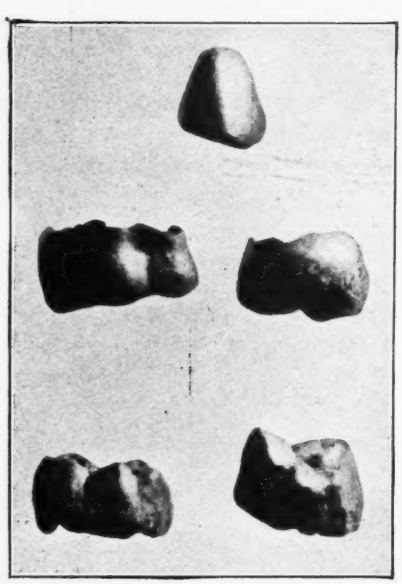

Fig. 5.

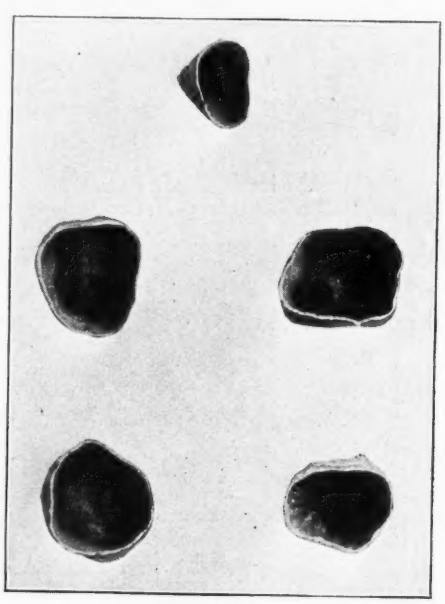

Fig. 6.

Fig. 5.—Gold crowns for molar teeth found in an Etruscan tomb of the ancient Vitulonia (Archaeological Museum of Florence). The enamel capsules of these four molars and one canine are perfectly well preserved whilst the ivory has entirely disappeared.

Fig. 6.—Same crowns as in Fig. 5, seen from the side of concavity of the enamel capsules.

Another denture, which was found in an ancient Etruscan tomb, is also exhibited in the Civic Museum of Corneto. It is made of two rolled gold bands soldered together at their extremities, and divided by four partitions,

Fig. 7.—Roman artificial denture found in 1907 near Teano, Italy.

Fig. 8a.—Skull from an ancient Etruscan tomb with gold-bound teeth, now in Villa Giulia, near Rome.

Fig. 8b.—Another view of the same skull.

forming in all five spaces. Three of these evidently are intended for the insertion of natural teeth; the other two spaces held, by means of pivots, two inserted human teeth; one of these had been lost, but the other is still firmly fixed in its place.

Another example of early dentistry was discovered in the ancient Etruscan necropolis near Orvieto, and is now in the possession of the Ghent University (Fig. 4).

This appliance was found adhering to a portion of the upper jaw in which the four teeth on each side appear to have remained in their places through life. The band, oval in shape, with the ends soldered together, is made of pure gold. Three spaces are formed by the aid of two partitions. As no pivot is found, it is probable the appliance was made to prevent the loss of the two incisors by giving them support.

A number of other interesting examples of "crowns" that have been preserved and that were devised by these skilled Etruscan dentists, are shown in Figs. 5 and 6, illustrating the remarkably high degree of skill the art had attained at this early period; and establishes the superiority of these people of antiquitity over their neighbors, proving that dentistry held an important place among the ancients.

Roman Dentistry.

After the conquering of Greece by the Romans, and the destruction of Corinth (146 B.C.) many of the Greek physicians located in Rome. Before the invasion, the inhabitants of Italy for many centuries "got along without doctors, although not without medicine."[1] From Greece and Tuscany, the Romans obtained their knowledge of medicine, which was introduced about 218 B.C. From actual records we have definite documentary evidence that the dental art was known and extensively practiced at an early date, prior to the time medicine became a profession, for one of the Laws of the Twelve Tables promulgated in 450 B.C., by a body of ten magistrates, refers to teeth sustained by gold wires. Among the laws was one that governed the use of gold for dental purposes. It was customary among the wealthy Romans to burn or bury articles of gold with the dead, but gold being scarce at that time, it was feared that burying of the dead might lead to abuse. Certain rules govering its use are found inscribed thereon, forbidding the burial of any gold with the body of a deceased person, other than that which is used to bind teeth together. The following, found in Cicero's work,[2] concerning the above mentioned tables is recorded: "Neither shall gold be added thereto (to the body), but it shall not be unlawful to bury or burn it with the gold with which the teeth may perchance be bound together."

Archagathus, a priest, was probably the first Greek physician who located in Rome (218 B.C.)—some two hundred years after the first evidence that there were individuals who practiced the dental art before medicine found its way among the Roman colonies.

If the statement of Pliny is correct, we find that the Romans did not need physicians until the teeth became defective, a suggestion that modern investigation is tending to establish.

1.—Plinius, lib. XXIX, Chap. V.
2.—Dionysii, Gothofredi. Corpus juris civilis, 1663.

It is apparent from this, that even at four and a half centuries before the Christian era, there were individuals who practiced dentistry in Rome, and, as there is evidence of the use of artificial teeth among the Etruscans before that period, they undoubtedly introduced their use among the Romans. Although at this time there were no regular medical practitioners in Rome, a dental appliance of peculiar interest has been found in the Greco-Roman necropolis at Teano, near Caserta. It consists of three human teeth fixed in a series of rings, made of laminated gold wire, which is turned around the teeth and soldered. This "bridge" was fixed to the mandible of the skeleton of a woman in a tomb, according to authorities, dated between 400 and 300 B. C. (Fig. 7).

Another specimen found in an Etruscan tomb, and now on exhibition at the Villa Giulia, near Rome, is a skull showing three lower (Figs. 8a and 8b) teeth "bound with gold." The work is in the nature of a bridge, and not fillings; a procedure recommended by Celsus, "If any teeth are loose from a blow or other accidents, they must be bound with gold to those that are firm."[3]

That the Romans, about the beginning of the Christian era, possessed a remarkable knowledge of dental art, is clearly shown by the number of writers of that time. Among others were Galen, Pliny, Horace, Lucian and Martial. False teeth we hear of in a Satire of Horace, "when a terrified witch let her false teeth drop out of her mouth as she ran away," and in the works of the poet Martial, we find the two following quotations, that leave no doubt that artificial dentures of bone, ivory and boxwood, were used:

> If teeth like thine, lady, we would display,
> With purchased bone and horn from India
> Our mouths must be arrayed.
> —*Martial lib. 1, 72.*

> Thais has teeth so black, Lecania, white,
> Seek you the cause? Lecania's teeth are bought,
> While Thais wears her own.
> —*Martial lib. 5, 44.*

Celsus, the greatest of the earlier Roman writers, lived some thirty years before the present era. His works, gathered mostly from the Greeks, sum up the whole medical and surgical science of the ancients. We find all through his work *De Medicina* passages devoted to the hygiene and diseases of the mouth, and he also alludes to the ailments due to dentition, convulsions and the accompanying fever. That the Romans did not escape the torture of toothache is evident from the numerous recipes recommended by him and others, and the various narcotics used to induce sleep. Celsus sympathetically remarks: "it may be numbered amongst the worst tortures, the patient must abstain entirely from wine, and at first, even from food; afterwards, he may partake of soft food, but very sparingly, so as not to irritate the teeth by mastication. Meanwhile by means of a sponge he must let the steam of hot water reach the affected part, and apply externally, on the side corresponding with the pain, a cerate of cypress or of iris, on which he must then place some wool and keep the head well covered up."[4]

3.—De Medicana, Chap. XII.
4.—Celsus, Chap. IX.

When a tooth is decayed, Celsus advises that there should be no haste in extracting same; but to try and relieve the pain by herbs and medicine, if possible. In those cases where the pain is violent, the application of hot poultices on the cheek and holding in the mouth of hot liquids, prepared with a suitable herb, is advised.

In his work, Celsus thoroughly treats on the diseases affecting the soft parts of the mouth, including tonsillitis, ulcerations and abscesses, and recommends lancing before an abscess becomes perfectly ripe, thus preventing pus remaining too long in the diseased part.

Fig. 9.—Celsus, the first to treat irregularities of the teeth.

Egenolff,[5] in his work published in 1541, has generally been credited with being the first author to mention irregularities of the teeth and their treatment. Hippocrates, we have already seen, noticed the relation between irregularities of the teeth and malformation of the skull and palate; and to the works of Celsus we must turn to find probably the first records concerning the treatment, "If a second tooth should happen to grow in children before the first has fallen out, that which ought to be shed, is to be drawn out and the new one daily pushed towards its place by means of the finger until it arrives at its just proportion." Again, "when in a child a permanent tooth appears before the fall of the milk tooth, it is necessary to dissect the gum all around the latter and extract it; the other tooth must then be pushed with the finger, day by day, towards the place that was occupied by the one extracted; and this is to be continued until it has finally reached its proper position."[6] He further states, "The root of a temporary tooth produces in children a new tooth, which usually pushes out the first; sometimes, however,

5.—Egenolff, "Medicine for the Teeth, to keep them Good and Sound", 1541.
6.—Celsus, Chap. XII, Book VII.

the new tooth appears either above or below it."[7] Thus we perceive that consideration was given to the eruption of the permanent teeth, their regularity, position and treatment, and that some knowledge of *orthodontia* was possessed by this ancient people.

As to the anatomy of the teeth, he describes as follows; "The fore teeth adhere by single fangs, the molars by two, and some by three and four. It may be observed the shorter tooth has the longer root, and the root of the straight tooth is straight, that of a crooked one generally curved."

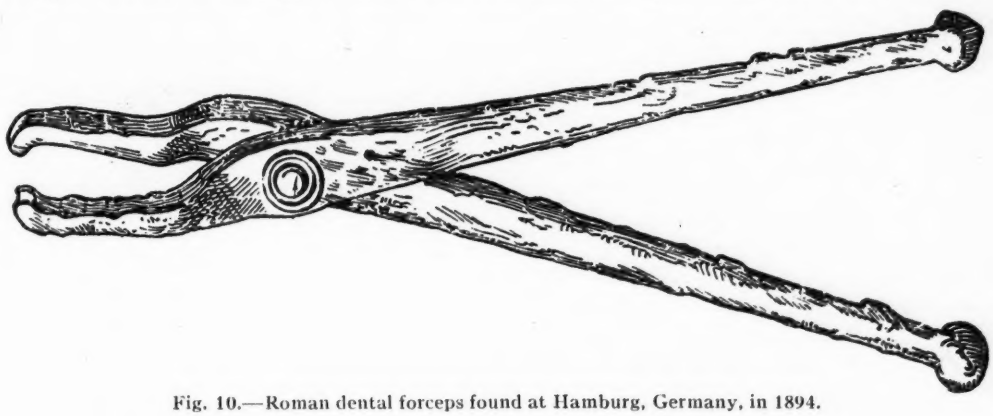

Fig. 10.—Roman dental forceps found at Hamburg, Germany, in 1894.

In regard to prophylaxis, the following is worthy of note, "After rising, if it be not in the winter time, the mouth should be rinsed with a quantity of fresh water." He was the first to recommend the use of a file in the mouth. In regard to extraction he advises there should be no haste; if it is decayed, "try local application, if not sufficient, then have it fall to pieces, by introducing a berry, such as the pepper berry, without its covering, thereby causing it to swell and break. Then if this is not a success, resort to extrac-

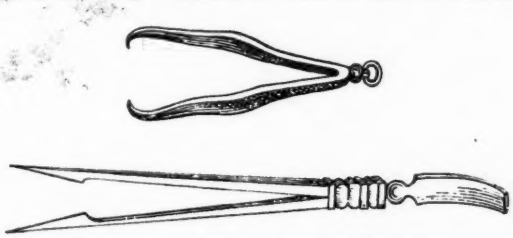

Fig. 11.—"Volselles" described by Celsus.

tion, first filling the cavity with lint or lead." This is probably the first record of filling carious cavities in teeth, but not, however, for their preservation. Celsus describes operative procedure in detail, enumerating the instruments used during his time.

1. General forceps, for the extraction of teeth, similar in pattern to our present dental forceps.
2. The rhizagra, for the extraction of roots, a forceps adapted for that purpose.
3. The specillum, used as a probe for exploration.
4. The cautery, a rod of metal, heated and applied to the part.
5. The vulsellum, an instrument of bronze, steel, or iron, used for removing splinters.

7.—Ibid, Chap. VII, Book I.

Caius Plinus Secundus, (A.D. 23-79). Historian, proconsul, encyclopædic writer, thirty-seven volumes of his writings being extant. Born at Como in the year 23 A.D., he perished at the destruction of Pompeii, 79 A.D. Though he did not practice medicine, a great number of interesting and important facts connected with materia medica and medical history are recorded by him.

In his work on *Natural History*, he dwelt at great length on the teeth. He enumerated a number of remedies used in his time to prevent and cure

Fig. 12.—Pliny. Perhaps the first to treat irregularities of the teeth by instrumentation.

toothache, but on the whole they were not as effective as those recommended by Celsus, owing to the charms, fables and superstitions contained therein. For instance he states that the ashes of the lung of mice, with dried liver of lizards be placed in the hollow tooth to stop decay and toothache. Another remedy of this type consists of rubbing the gums with the tooth of a man who had suffered a violent death.

He emphasizes the necessity of thoroughly cleansing the teeth with salt, and the use of an uneven number of mouthfuls of water (1, 2, 3, 5, 7, etc.),

and advocates the use of a bone of the hare,[8] sharp as a needle, as a toothpick to prevent bad odors in the breath. He gives far less practical advice for further prophylaxis, in that everyone should eat a mouse every two months to ward off the pain in the teeth. He gives many prescriptions for tinctures and tooth powders, and divides dental pains into three groups, the first having origin in the teeth, the second in the gums, and the third in the nerves.

Loosening and early loss of the teeth seem very prevalent amongst the Romans, the writers devoting some attention to *pyorrhea* and giving many prescriptions for its prevention and cure. "Men have thirty-two teeth, and women a lesser number." To have a greater number, says Pliny, usually indicates long life. "The presence of two eye teeth at the right side of the upper jaw presages favorable fortune, on the left side, however, they are of sad foreboding. We learn here pobably for the first time the presence of supernumerary teeth.

Fig. 13.—Roman toothpick and toilet Etui.

"Timarcus, Son of Nicocles of Paphus, had two rows of molar teeth, whilst a brother of his did not change his incisor teeth at all, which therefore, wore down little by little." "There once lived a man who had a tooth in his palate."[9]

"Teeth are not necessary for mastication alone, for the foremost ones regulate the voice and words, producing by the beat of the tongue special sounds."[10]

Pliny condemned, and advocated filing elongated teeth, to bring them into proper alignment; probably the first mechanical treatment for correcting irregularities, and a method that remained in practice until the last century.

Martial, (40-101 A.D.). No allusions are made by the early Roman writers on medicine, such as Pliny, Celsus and others, to the practice of dentistry as a separate branch of the healing art. Not until the time of Martial do we find the name of one who "extracts or cures diseased teeth."[11] The name of Casellius has come down to us as that of the first practitioner in dentistry (90 A.D.). Martial relates how he was held in the greatest esteem by women of high degree, in that he was able to restore by means of his art the loss they had sustained, and thereby they retained their charms.

8.—Ibid, Chap. XLIX, Book XXVIII.
9.—C. Plinii Secundi, Historicae Mundi, lib. XI, Chap. LXIII.
10.—C. Plinii Secundi, Chap. XV, Book VII.
11.—Martial, Book X, Epigram LVII.

He was known throughout the Roman Empire for the skill he possessed in treating diseased teeth and restoring those that were missing.

The "Epigrams of Martial" contained numerous allusions to dentistry. Toothpicks (*dentiscalpia*) are mentioned a number of times, showing how prevalent they were during that period. (Figs. 13 and 14).

Artificial teeth must have been used by the Romans, as Martial in his Epigrams alludes to several of them. "I am not accustomed to clean bought teeth;"[12] again he remarks, "without shame thou insert purchase lots of hair and teeth," from which we infer that sets of artificial teeth could be purchased.

"She at night lays down her teeth just as she does the silken robes."[13] It is evident that removable artificial dentures were made, and probably not only partial pieces but likewise full sets were constructed.

Fig. 14.—Roman tweezers, combined earpicks and toothpicks, razor and votive eye.

We have seen from records preserved, and the specimens of ancient dental workmanship that have been brought to light by archæological excavations, that the Greeks paid considerable attention to the teeth and mouth; that the Etruscans made a greater advance in prosthesis in the way of bridgework; but it was left to dentists of ancient Rome to adopt the methods of both the Greeks and Etruscans, and improve on their craftsmanship in the ways of crown and bridge work. Their advancement in dentistry, and the mechanical ingenuity of the Roman dentist, is shown by the interesting denture excavated at Satricum, near Rome, which consists of "two small plates of gold stamped out, representing respectively the lingual and labial superficies of a middle lower incisor; these two pieces are soldered together to form the crown of the tooth. At its base the crown is soldered, back and front, to a narrow strip of gold which folds back on itself at each end, so as to tightly encircle the two neighboring teeth on the right and on the left which thus serves as a support to the appliance."[14]

Scribonius Largus; physician to Emperor Cladius, was a writer on medicine, who alluded to the practice of dentistry. In his book *De Compositione Medicamentorum* we learn again that the dental art was practiced by persons

12.—Martial, Book XIV, Epigram LVI.
13.—Ibid, Book XIV, Epigram LVI.
14.—V. Guerini, History of Dentistry, p. 101.

not belonging to the medical profession, but by those who devoted their time exclusively to dentistry. He strongly advises against the division of medicine into separate special branches, and that the true doctor must be skilled in curing all kinds of afflictions, and not attribute the name of "doctor" to themselves, simply because they know how to cure some diseases.

For the treatment of toothache, he states that in the opinion of many the only true cure is the forceps, but he cautions his fellow practitioners that it is not always advisable to practice extraction even when the tooth is affected with caries, but in many instances it is better to treat surgically, by cutting away the diseased parts with a scalpel designed especially for the purpose.

Archigenes. About the year 100 A.D., Archigenes, surgeon to the Emperors Trajan and Hadrian, noticed for the first time, that in certain cases of odontalgia the interior of the tooth was affected and concluded that this "inflamation of the pulp" was what caused the pain. His idea was that the pain was caused by the existence of morbid matter in the interior of the tooth. To properly relieve this, when a tooth appears discolored without being affected by caries, Archigenes recommends its perforation with a small trephine. He applied this instrument to that part of the tooth most discolored, and drilled right through to the center of the tooth.[15] When the pain was caused by a carious condition, he recommended cleaning the teeth, and the thorough cleansing of the cavity, afterwards filling same with a mixture of red nitre, pounded peach kernels, and resin.[16]

This is probably the earliest allusion made to an actual dental operation other than where extraction was recommended, and proves among other things, that something of the structure of the tooth, as well as the existence of the pulp cavity was known, and that extraction was not to be practiced unless absolutely essential, the preservation of the tooth or teeth being of greater importance. This is again well illustrated, for Archigenes advises in case a tooth is broken and gives trouble, cauterization with a red hot iron.

15.—J. R. Duval, Paris, 1808, p. 19.
16.—Galeni de compositione Medicamentorim secundum locos, liber V.

TREATMENT OF A CLASS II, DIVISION 1, CASE.

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THE distinguishing characteristics of cases belonging to Class II, Division 1, are distal occlusion of both lateral halves of the lower arch, more or less undeveloped mandible, narrowed upper arch, lengthened and protruding upper incisors, and lengthened lower incisors. It will also be remembered that those afflicted with this type of malocclusion are in almost every instance affected with some form of nasal obstruction, necessitating mouth-breathing which usually begins at an early age, causing the mouth to be held open almost constantly and the lips and buccal muscles to act abnormally. In the effort to breathe, the upper lip is drawn upward and fails to develop in size and function, exercising little restraint upon the labial movement of the incisors. Their protrusion, therefore, becomes more and more pronounced, partially as a result of pressure from the tongue

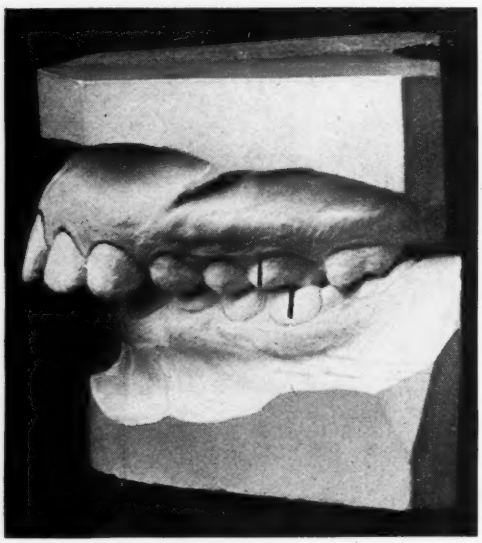


Fig. 1.

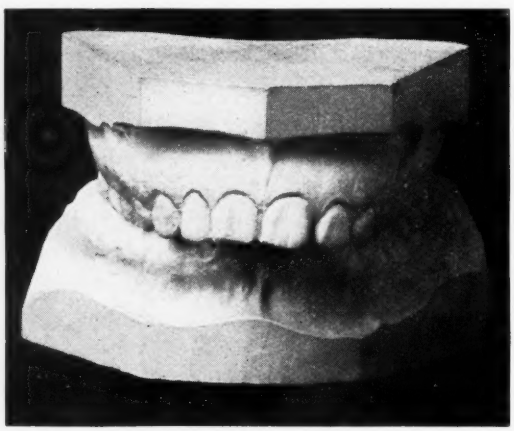


Fig. 2.

Fig. 1.—Showing posterior (distal) relation of the lower arch to the upper before treatment.
Fig. 2.—Front view before treatment.

and lack of development of the arch through malocclusion, but principally because the lower lip is so frequently forced against their lingual surfaces in swallowing and in the effort to moisten the mucous membrane of the mouth. Both upper and lower incisors become lengthened, probably from lack of function, so that the occlusal edges of the lower incisors are in many cases in contact with the mucous membrane of the hard palate.

It is a common mistake to suppose that this form of malocclusion is the result of over-development of the maxilla.

The narrowed upper arch and lengthened upper teeth, the mandible diminished in size and lower arch distal in relation, the arrest in the develop-

ment of the nasal apparatus, the modification in form and function of the nose and muscles, and the marred facial lines are but the natural results of the failure of the first permanent molars to lock normally at the time of their

Fig. 3.

Fig. 4.

Fig. 3.—Photograph, showing full profile before treatment.
Fig. 4.—Photograph, showing full front view before treatment.

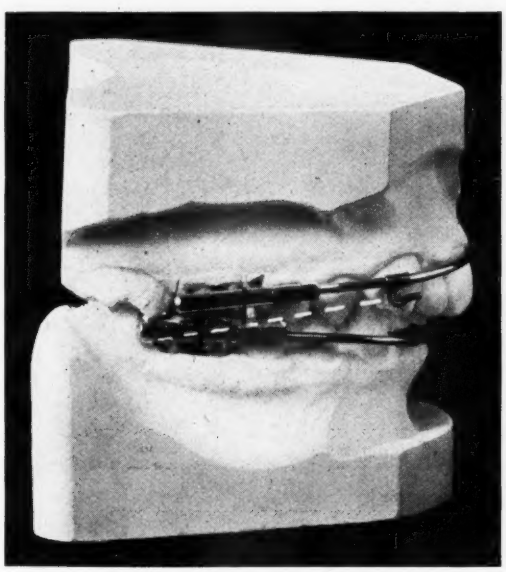


Fig. 5.

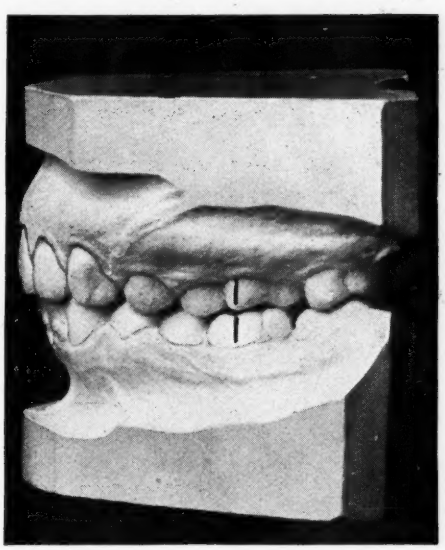


Fig. 6.

Fig. 5.—Shows the appliance adjusted for treatment. Dotted line represents intermaxillary rubber.
Fig. 6.—Shows the occlusion after the case has been treated. The changes in occlusion are clearly manifest.

eruption, accompanied and probably preceded by pathological conditions of the nose or throat that established the mouth-breathing. It seems reasonable to believe that the mandible is arrested in development by being

held distally through malocclusion and the abnormal action of the muscles. And there is yet another reason which seems to have been unnoticed, namely, the abnormal distribution of force on the lower teeth through the malocclusion. Normally the force is distributed on the line of the long axes of the teeth, but when the lower molars lock in distal occlusion the force is

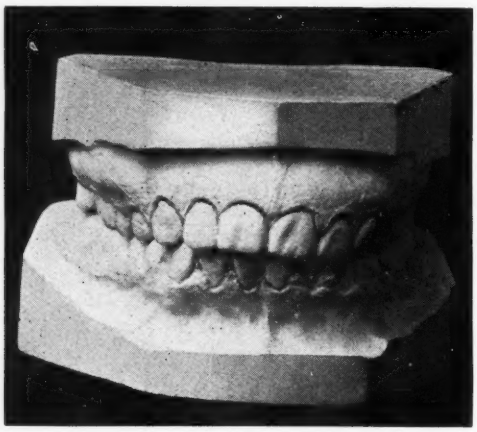


Fig. 7.—Front view after treatment.

Fig. 8.

Fig. 9.

Fig. 8.—Photograph, showing full front view after treatment.
Fig. 9.—Photograph, showing full profile after treatment.

received principally upon the anterior half of their crowns, as shown in Fig. 1, the tendency being to drive their apices distally, or at least to prevent their normal movement forward, which would also prevent the normal growth and lengthening of the jaw. This seems most probable when we consider how pronounced is the interference with the normal growth of the

mandible, maxilla, and alveolar process, by the abnormal distribution of force.

Patient, seventeen years old was a mouth-breather; adenoids were removed about two years before treatment.

Fig. 1 shows posterior (distal) relation of the lower arch before treatment. Attention is called to the long over-bite of the upper central incisors and complete locking of molars and premolars.

Fig. 2 shows the front view before treatment. Note separation between left central and lateral and long over-bite.

Fig. 3 is a photograph of the patient showing full profile before treatment.

Fig. 4 is a photograph showing full front view before treatment. Note protruding upper teeth, short upper lip and the under-developed mandible. The effect upon the face was most unfortunate, giving a very weak expression from the nose downward.

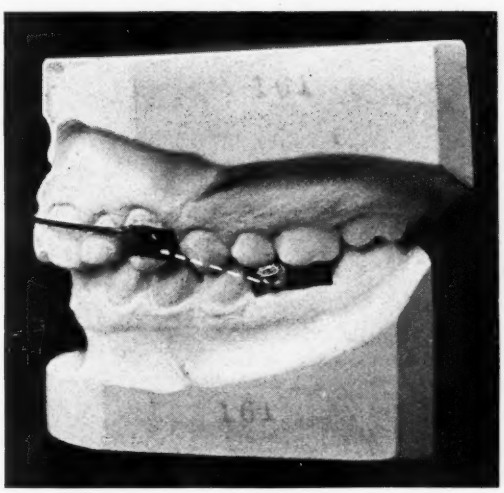


Fig. 16.—Shows retainers adjusted ready for intermaxillary retention. Dotted line represents rubber band.

Adjusting appliance. Heavy ligature wire was put between the first molars and first premolars and first and second molars and twisted up snugly around the contact points. The patient was dismissed for two or three days, allowing ample time for the teeth to separate. The wires were then removed, and a molar clamp band carefully fitted to the first molar, the buccal tube having been removed from the band, making it more comfortable for the patient while becoming accustomed to wearing the appliance. The patient was then dismissed for a week, and at the next setting another molar band was adjusted.

At the next setting one of the arches was adjusted as follows: The buccal tube was soldered to one band and lined up so the arch would lay close to the teeth and at the gingival line of the anterior teeth, and the buccal tube is then adjusted on the opposite side parallel with the arch. These tubes are adjusted so the arch slips in and out freely. The arch is adjusted passive and the patient is dismissed for one week. At the next two settings the balance of the appliances are fitted. All bands are carefully fitted and

cemented, the cement being mixed to a creamy consistency and evenly spread on the inside of the band. It is then gently forced into place. Hold the finger over the top of the band to force the cement down around the tooth and screw up tight.

Fig. 5 shows the appliance adjusted for treatment. Sheath hooks are placed on the upper arch opposite the canines. The dotted line represents the intermaxillary rubbers. The rubbers are hooked over the buccal tubes of the lower arch and the sheath hooks on the upper arch. The first week the rubbers used were very weak and were worn during the day. Later, stronger rubbers were used and worn constantly until the teeth were moved to their normal relation.

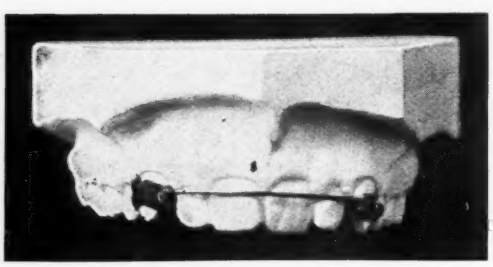


Fig. 11.

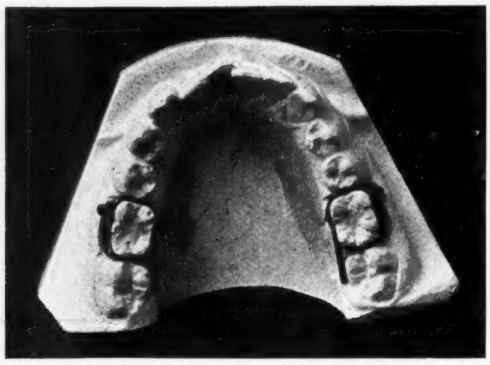


Fig. 12.

Fig. 11.—Front view of upper anterior teeth, showing retainers.
Fig. 12.—Occlusal view, showing retainers adjusted. (Technical model.)

Fig. 6 shows the occlusion after the treatment and ready for retention. The time required to move the teeth was about nine months.

The lower teeth were moved mesially and the upper teeth were not moved distally.

There is a difference of opinion as to whether this can be accomplished. After treating a number of this class of cases and giving them very close observation, I have proved to my own satisfaction that the lower teeth can be moved without moving the upper teeth but very little distally, if any. I am speaking of the molars and bicuspids, as the upper anterior teeth in this type of cases are moved distally into the line of occlusion. In this class of cases, in nearly every instance the lower first molars and all the teeth anterior to the first molar moved forward and left space between the first and second molars; in this case the space was about equal to the distance the lower teeth were moved mesially.

Fig. 7 is the front view on completion of treatment. Note the space closed between the central and lateral incisors and the absence of over-bite.

Fig. 8 is a photograph showing the full front view after treatment. In comparison of Figs. 4 and 8, the development of the mandible and upper lip is very apparent. The weak expression has changed to one of marked intelligence.

Fig. 9 is a photograph showing full profile after treatment.

Retention. Fig. 10 shows retainers adjusted ready for active intermaxillary retention, the dotted line representing the rubber band.

Retention of the superior anterior teeth. The arch having been expanded in the region of the canines, and the anterior teeth moved distally, they must be retained in their new position, and in order to do that, bands are placed on the canines and a wire passed from one canine band to the other, of sufficient stiffness to retain the buccal expansion in the canine region and prevent the backward movement of the anterior teeth (see Fig. 11). Hooks are placed on the cuspid bands for attaching intermaxillary rubbers.

Fig. 12 shows the occlusal view of the retainers as placed on the lower teeth.* Plain bands are placed on the first molars. Hooks are placed opposite the mesial buccal cuspids for attaching rubbers. The pull of the intermaxillary rubber will be forward and upward. As the premolars are anterior to the molars, there will be no danger of displacing the molars forward; but as the pull of the rubber band is from the buccal side of the first molar, there will be a tendency to displace the first molar bucally.

To prevent this a spur is placed on the lingual side of the band extending distally to engage the second molars. The intermaxillary rubbers were worn constantly the first four months, after which they were worn during the night. The period of retention was about seven months.

A CASE HISTORY FROM PRACTICE.

By Hugh G. Tanzey, D.D.S.
Associate Professor of Orthodontia, Western Dental College, Kansas City, Mo.

THE ever increasing number of malocclusions which the general practitioner sees, make it apparent that those engaged in the general practice of dentistry must know something about malocclusions. It might be supposed that the general practitioner would be the man most suited to treat malocclusions, but the demands which are made on his time, to repair the damage done to the oral cavity, leaves him but little time to devote to malocclusions. That small amount of time can be best spent by becoming familiar with the causes of malocclusion, the manner in which malocclusions develop, and the rapidity with which they become extreme deformities.

The general practitioner must also remember that if he is able to advise and refer cases to the men in special fields, that others will also refer cases to him. It is with a view of showing the possibilities of treatment, and the manner in which cases develop, that I am giving the report of this case.

History.—May, 1913, the patient, a healthy robust girl of 12 years, accompanied by her uncle, came for consultation (see Fig. 2). The gums were in excellent condition, and, with the exception of three or four slight cavities in the first permanent molars, the teeth were in fine shape. No hypertrophied tonsils nor adenoids were found. There was a premature loss of the upper decidious cuspids, which allowed a collapse of the anterior portion

*The model shown in Figs. 10, 11 and 12 is not the model of the finished case but a technical model for demonstration.

of the arch posteriorly, and the bicuspids mesially. There being no nasal obstructions, the lips were normal except for the displacement by the cuspids, which were in labioversion.

The family, consisting of parents, one brother, two uncles and two cousins who came under my observation, possessed malocclusions, as is the usual case.

Etiology.—The early loss of the temporary teeth by caries probably had much to do with the causing of this malocclusion. The upper incisors, not being supported by the cuspids, instead of being pushed forward as nature intended by normal development of the anterior portion of the arch, actually dropped or lagged back at the same time the posterior teeth moved forward out of normal occlusion, because of the lack of approximal contact.

Diagnosis.—This case was entered on the record sheets as Class II, Div. 2 case, and, by way of explanation, the classification was written on the side parenthetically (Bilateral distoclusion accompanied by labioversion of the superior cuspids—Fig. 1). The upper molars and bicuspids occlude

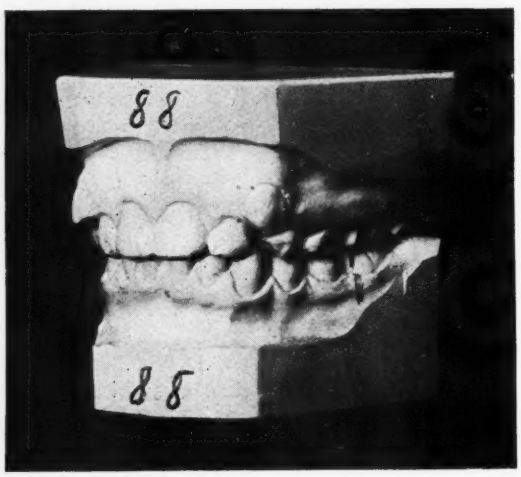


Fig. 1.—Model of Case No. 88, girl 12 years of age, before treatment. Notice the sup. left 2nd temporary molar retained.

mesial to the lowers on both sides, and on the left side the 2nd deciduous molar is in position with the sup. cuspids, apparently taking positions entirely outside the collapsed arch. The arrest of development is noticeable both in the incisor and bicuspid regions.

Prognosis.—Since, at this age, the bones of the face are rapidly nearing complete development, it is obvious, unless immediate treatment is begun, that permanently distorted features will result. This will be accompanied by impaired masticatory ability and gingival disturbances; inviting pathological conditions, and caries of the enamel, because of difficulty encountered in cleaning the teeth and the decreased blood circulation through the gums, from crowding. If treatment is begun at once, very favorable results may be expected that will at least please the patient and not discourage the operator.

Treatment.—From an examination of the models in Fig. 1, it will be seen that the treatment will necessarily consist of a labial movement of sup.

incisors, a disto-lingual movement of the upper cuspids, and a disto-buccal adjustment of the upper bicuspids and molars, together with a slight expansion of the lower arch.

May 6, 1913.—Consultation; cleaned teeth and took plaster impressions.

Fig. 2.—Photographs of 12 year old patient before treatment. Model No. 88. Case No. 88.

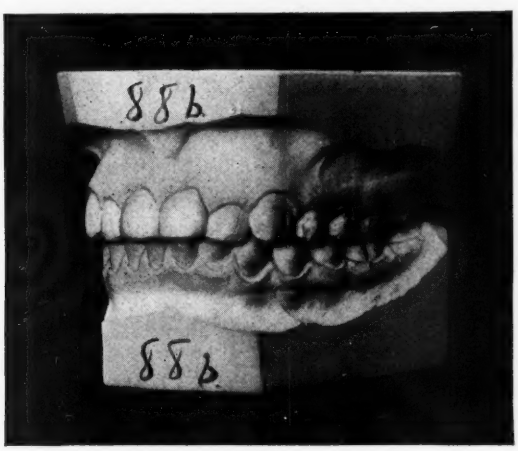


Fig. 3.—Showing models of Case No. 88 when dismissed after 21 months of treatment including the retention.

May 17.—Consultation with the mother present, using models for reference.

June 17.—Fitted and adjusted upper right and left molar clamp bands, medium size, and took measurements of right and left first bicuspids with coin gold ribbon, 36-gauge.

June 20.—Cemented upper molar clamp bands and first bicuspid bands

with spurs, using 20-gauge iridio-platinum for spurs, soldered to disto-gingival angle of bands, with 16k gold solder.

Fig. 4.—Showing photographs of Case No. 88, Model No. 88, after treatment.

June 23.—Adjusted the alignment wire with the addition of the intermaxillary hooks immediately distal to the cuspids, also with a slight loop bent up in the alignment wire to engage the tip of the cuspids. The align-

ment wire, or expansion bow, was ligated at this sitting (placing very little stress on the teeth) to the incisors and bicuspids, very close to the gingival line, with very little expansive stress in the molar region. The patient was supplied with powder and wash, and instructions to use it liberally and to return for more when the supply was exhausted (without additional cost to the patient, as is the writer's custom).

September 1.—The lower molar clamp bands and plain expansion arch were adjusted with slight expanding stress on all the teeth except the first molar, by ligating them to the arch.

September 17.—Intermaxillary elastics were adjusted, using very light rings cut from a pure gum tubing, measuring $\frac{1}{4}$ inch inside, and cut on the bias. The nuts on the upper arch being kept tight against the mesial end of

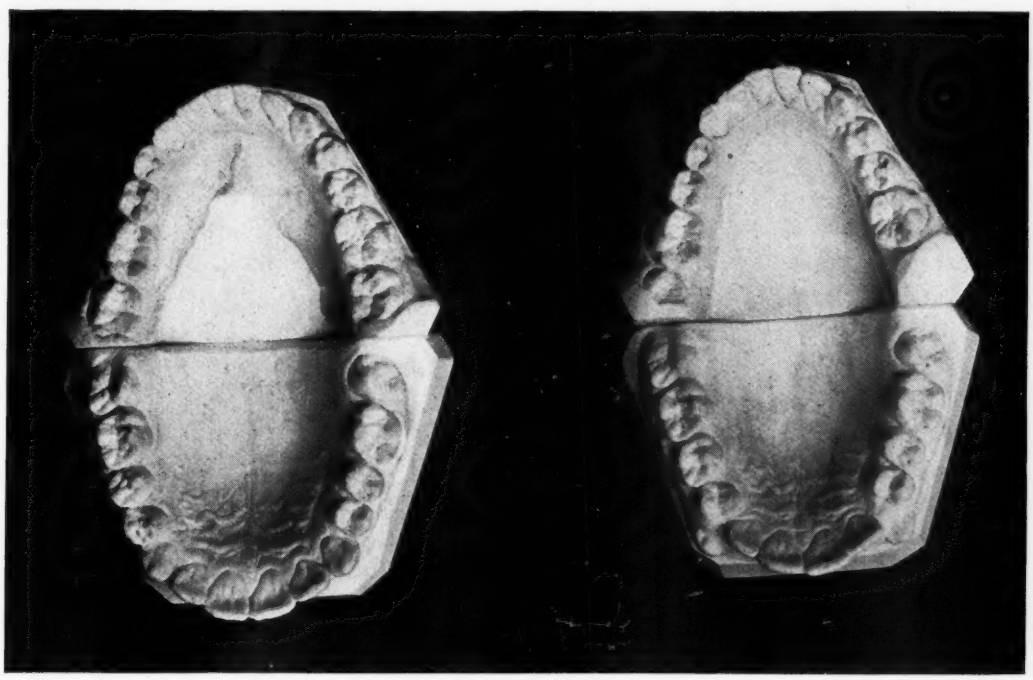


Fig. 5.—Showing occlusal view of models of Case No. 88, before and after treatment. Notice the arch has been widened almost one-half inch.

the buccal tubes on the molar clamp band, thus using reciprocal force in forcing the molars backward, and the incisors forward, with the additional support of the intermaxillary elastics, pitted against the molars and the bicuspids; a rubber wedge was later used under the arch against the labial surface of the cuspids.

October 15.—The upper arch was removed, cleaned and readjusted, with more expansion in the molar region, and fitted to lay more snugly against the teeth. The teeth were also cleaned. Forty-five minutes of time was required.

December 3.—The upper left 2nd temporary molar was extracted.

February 18, 1914.—It was necessary to place a band with a spur upon the upper left 2nd bicuspid, recently erupted.

June 12.—The upper arch was removed and readjusted. No expansion

in the molar region. Teeth cleaned. This appointment consumed fifty minutes.

November 23.—The superior alignment wire and molar bands were removed, leaving the bands on the bicuspids. A retaining appliance was made which consisted of bands on the lateral incisors, which bands were made of 36-gauge, coin gold, soldered with 14k gold solder. A lingual retaining wire of 18-gauge iridio-platinum was soldered to the bands which were made on the lateral incisors and the distal ends of the lingual arch extended back to the molars, and ligated to the spurs on the bicuspid bands. Spurs made out of 20-gauge iridio-platinum wire were soldered to the labial surface of the lateral bands, the mesial ends projecting over on the central incisors, and the distal ends resting on the canines. Impressions were taken with modeling compound. Three and one-half hours were required to make and adjust this appliance.

December 17.—Removed lower treatment appliance. No retaining appliance thought necessary, as the lower teeth had not been moved much, and had been retained sufficiently by the alignment wire.

March 1, 1915.—The superior retaining appliance was removed.

March 16.—The impressions were taken for models in Fig. 3. Pictures shown in Fig. 4 were taken in July, after retaining appliances were removed in March.

During the 21 months of treatment, the patient made 60 visits to my office, averaging $22\frac{1}{2}$ minutes each. Several hours in addition, were consumed in laboratory work, constructing models and appliances.

I think the readers will agree with the writer when he says, "Neither conditions in the beginning nor final results are ideal." Nevertheless the case is reported.

CURRENT ORTHODONTIC LITERATURE

EDITED BY H. C. POLLOCK, D.D.S.

Some Infections of the Head and their Causes.

IN discussing some infections of the head and their causes, Dr. J. Sheldon Clark, Freeport, Illinois (*Illinois Medical Journal*, August, 1915), takes up the question of malformations of the maxillary arches as a result of mouth-breathing. Unfortunately it seems this subject has attracted very little attention among general practitioners of medicine, but occasionally we come across a medical writer who has a good grasp of the subject of malformations of the mouth and jaws.

* * * *

One of the most important deviations from the normal, in so far as the head is concerned, is that found in mouth breathers. Any child who breathes through his mouth rather than his nose, does so either on account of nasal obstruction or from force of habit. Habit mouth breathing may follow some sudden stoppage of the nose; as from an acute cold in the head, or it may result from the desire to be continually talking, as is seen in some children.

What then occurs from this habit of mouth breathing? First and foremost there is a lack symmetry and the proper development of the body. Not alone the head, but the chest, heart and other organs. When a child breathes through the mouth, the tongue does not lie against the hard palate, neither does it press outward on the arches of the jaw, but it lies loosely in the mouth. The lack of this outward pressure and upper force of the tongue just mentioned, causes the upper jaw to be tardy in its development and, in fact, it does not attain the dimensions it should have. The teeth attain their ordinary size and number and must be placed on a jaw that is shorter and narrower than it should be. The lower jaw, however, deveolps in a nearly normal degree.

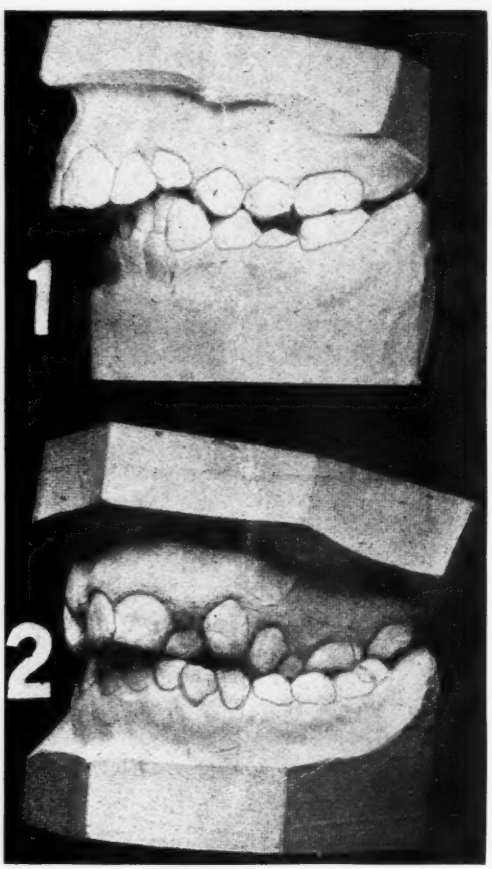
From this derangement of the teeth we have two varieties of deformities—either the upper teeth overhang, or the ones of the under jaw protrude. The upper teeth should normally overlap in slightly closing the mouth, but where they do to excess and, combined with a retreating lower jaw, we have then the picture of the characteristic facies known as the "rabbit mouth."

In the second variety, where in addition to stuffiness of the nose, there is obstruction at the base and sides of the tongue, caused by very much enlarged tonsils, then the lower jaw is drawn downward and forward by muscular action in order to clear the mouth and fauces, and we have the type known as "wapper jaw."

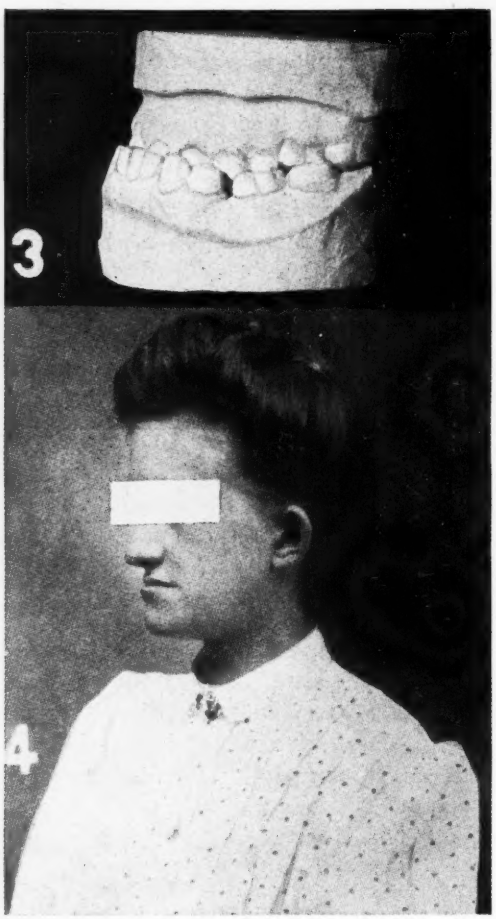
From an economic standpoint it is hard to estimate the cost of the damage that is done by reason of this one common defect, viz: mouth breathing. There is lessened physical and mental capacity and resistance to the various infections of the mouth, nose, throat, ear, bronchi and lungs is very much lessened. In mouth breathers the inspired air is not properly filtered and

thereby a vastly greater number of bacteria gain entrance to the nose, mouth and throat, causing frequent local and general infection.

There are many causes other than pathological ones that make for malocclusion of the teeth. We might speak of hereditary tendencies, influences brought about through a faulty diet, both as regards bottle-fed infants and irregularities later on in childhood, such as too much of the sweetmeats, etc. Then the various traumatisms that are ordinarly met with. One very frequent being that received through thumb sucking in infancy; also the numerous falls in infancy, wherein the tooth germs are damaged. The case here



Figs. 1 and 2.



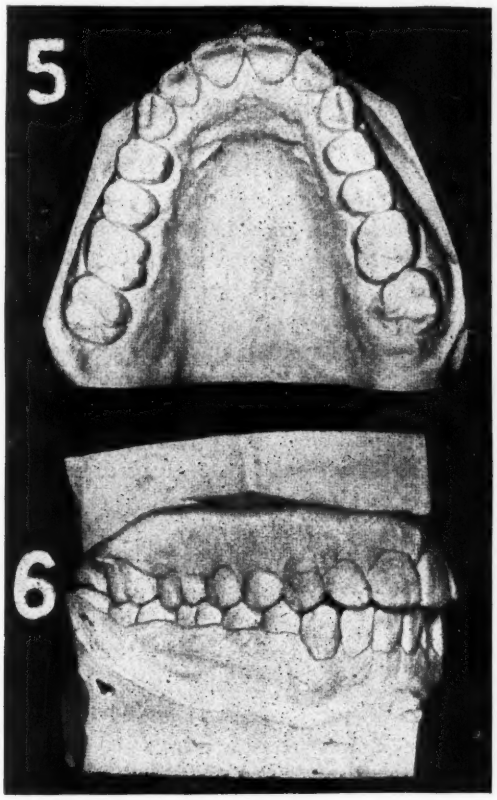
Figs. 3 and 4.

shown in Figures 5, 6, 7 and 8 is fairly representative of what effect heredity plays in development. The model of the upper jaw shows a perfect dention (Fig. 5), while the model of both the upper and lower jaw (See Fig. 6), shows a perfect alignment. However, one will see that these perfect teeth are not in keeping with the general facial development of their possessor. (Figs. 7 and 8.) There is an eugenic cause for this inequality of relationship between the general facial development and that of the jaws and teeth; there being a great disparity in the anatomical development as exhibited in the parents.

In mouth-breathers the tonsils are habitually found enlarged and the

seat of repeated septic attacks, along with the tonsils the entire structure known as Waldeyer's ring is involved in an attack. This includes the pharyngeal tonsil or adenoid structure in the naso-pharynx, the pharyngeal and lingual tonsils. Most of the attacks of sudden rise in temperature upon slight exposure to cold are caused by infection somewhere in the lymph structures comprising Waldeyer's ring.

Of the general systemic infections more easily acquired on account of physical abnormality and consequent impairment of general bodily tone, is tuberculosis. Most of the tubercular subjects who die at the age of 18 to 40 have secured their initial tubucular infection during childhood. Had they been normal as regards their capacity for intake of air there is no doubt but that they might have overcome the primary infection.



Figs. 5 and 6.

Rheumatism is one of the diseases that is most largely contributed to by oral sepsis of one sort or another, and in this we would include the other structures connecting with the mouth, as the nose and its accessory sinuses and the ears. I have seen remarkable subsidence in an intractable case of rheumatism follow the extraction of some old snags of teeth that were bathed in pus.

Mouth breathing has a further retarding influence upon the development of the nose. The growing child sleeps from eight to fifteen hours during a day. If, during this time, he lies with the mouth open, then the pressure that is normally exerted against the upper jaw is lacking, and there

is not the normal widening of the jaw. This in turn affects the development of the nose, in that the vomer is pressed upward and out of place by the high arching of the palate. As a consequence there are irregularities within the nasal chambers, enlarged and turgessed turbinals, deviations of the septum, etc. Now, if the nose were normal and we breathed as we should, the air would be sifted mechanically of its impurities and we would not be subjected to the repeated attacks of cold in the head, that do so annoy.

Continued turgescence of the turbinals may lead to their degeneration, and in turn an infection of the ethmoid cells with a concomitant asthma that makes living almost unbearable. Along with this the sense of smell is very much obtunded or is lost altogether. Many of our foods are palatable to us mainly on account of their delightful odors. With the sense of smell gone, the appetite wanes and physical stamina also diminishes with the lessened intake of food.

Along with infection of the ethmoid cells, usually the sphenoid sinus, the frontal sinus and the maxillary sinus become involved. The middle ear and mastoid cells may be infected by way of the Eustachian tube. One of the greatest complications attending infection of the ethmoid labyrinth

Figs. 7 and 8.

and sphenoid sinus, is that of optic neuritis, caused by infection gaining entrance to the sheath of the optic nerve. The optic nerve in its course through the optic foramen courses along the outer wall of the sphenoid sinus and the lateral wall of the last ethmoid cells. If this condition is allowed to persist, blindness may result. At other times, in acute attacks of cold in the head, a patient will complain of pain in and about the eyes, when it is not the eye or structures of the orbit that are affected, but rather the ethmoid cells that lie on the inner wall of the orbital cavity.

The frontal sinus is infested from below. The drainage of the frontal sinus is not of the best when once its structure becomes the seat of septic inflammation. The sinus early becomes closed off and there results an absorption of the contained oxygen; this results in decided pain over the frontal region, even though there may be no decided infection.

The antrum of Highmore is a large cavity within the upper maxillary bone that is connnected directly with the nasal cavity through its normal opening which lies in the middle meatus of the nose. Infection of the ant-

rum takes place either from the nose or from the mouth. Perhaps the greater part of the infections take place from the molar teeth. It is infection in the molar teeth which protrude within the antrum that gives rise to most of the dental infections. Pus in the antrum, in an appreciable quantity, gives rise to a pain and swelling that is characteristic. Therefore, the best prophylaxis looking to the eradication of antral disease is oral cleanliness and thorough dental supervision of the teeth.

Through the Eustachian tube we have another way by which oral infection travels. Most of the diseases of the middle and internal ear are caused primarily by some trouble in the mouth, nose or naso-pharynx. One quite prominent factor in producing acute otitis media, is the manner of blowing the nose that is indulged in by some people. You have all seen it. The possessor of an acute rhinorrhea will blow both nostrils in perfect unison, and with a clarion tone that would relegate the trumpet of Gabriel to a seat in the back row of the celestial orchestra.

With infection of the middle ear there is an resultant inflammation that at first is serious, then hemorrhagic and later purulent. It takes but a few hours for the entire process to be developed. Ear-ache is a warning to one that there is trouble in the middle ear. In all such cases one should not prescribe "drops" for the ear without first having examined the drum membrane and be cognizant of the pathology going on in the middle ear. A few hours may mean a great deal to one suffering from acute otitis media. A timely paracentesis of the drum membrane will cut short the duration of the trouble, prevent pus formation and the possibility of antral and mastoid cell involvement.

The loss of hearing is also quite an important factor. In recent years we have heard a great deal regarding the conservation of vision, but very little has been said with reference to a plan for the conservation of hearing. Of the two ailments, I believe those unfortunate who cannot hear or are very much afflicted with impaired hearing suffer more than those who are afflicted with poor vision or loss of eye sight altogether.

We have all seen children that are more or less troubled with a discharge from the ears. This trouble is looked upon by many as a matter of course. The public is being educated and the doctor must keep abreast with this education and not allow his cases of infections of the middle ear to go on to suppuration, without any notice other than the use of "ear drops" to alleviate the pain. As was said before, the early puncture of the drum membrane must be done, and you will be surprised at the ready healing, instead of the weeks, months and maybe years of discharging pus that may take place from ears in neglected cases.

When we consult the statistics of brain abscess and find that in over 80 per cent the abscess in the brain is of otitic origin, then we may well regard with more concern these cases that in the beginning are only that of earache following an acute cold in the head.

Let us for a moment study a little more closely the subject of tonsillar infection.

D. MacLachlan of the University of Pittsburgh was reported at the 1914 meeting of the American Medical Association to have examined into the

histopathology of 350 pairs of tonsils that had been removed for various reasons and makes the following statement:

"We have observed that when symptoms of acute tonsillitis are present, there is always a pathologic basis, as shown by the ulceration of the lining of the crypt. We, therefore, feel that a similar lesion is present in the tonsillitis preceding rheumatism and, as far as we know, this lesion differs in no way from that of acute lacunar tonsillitis. We regard the ulceration of the lining of the crypts as being the vunerable point of entry of organisms from the mouth. It matters little, apparently, what organisms from the mouth have produced the lesion, for once the ulcer has formed, it is possible for any type of organism to gain access to the deeper tissues."

In regard to the removal of tonsils for supposed systemic infection we should be careful and make our diagnosis on good tenable grounds. Just because we happen to have before us a throat with tonsils protruding a considerable distance beyond the pillars, is not sure evidence that they are the source of trouble and of danger to their possessor. In looking for the cause of septic infection, do not forget the teeth, the nose, and its various sinuses and cells, the ear, the tear sac, the appendix, the gall bladder, or even an ingrowing toenail. Any one or all of these can be the source of the trouble.

Dr. John F. Barnhill of Indianapolis reported a case to the point at the Atlantic City meeting of the A. M. A. in 1914. A certain college professor had been so ill with heart disease for a long time that he could not carry on his work. He came into the hands of Dr. Osler, who went over him again and again and finally said, "Your tonsils are the cause of all your trouble." Dr. Osler advised that the patient be operated on thoroughly, but the tonsils were merely clipped. The illness continued over a period of two years. Dr. Osler had gone abroad and the patient consulted Dr. Janeway of New York, who, after careful examination, told him the same thing. Then the patient's tonsils were completely enucleated and from that time on he recovered promptly and remained well.

Just the past week I was called in consulatation on an interesting case of continuous and persistent rise in temperature as exhibited by a dentist living in a nearby town. This man had been for several weeks feeling more or less "done up," as he expressed it. He was tired, lacked energy to go about his work, and had noticed that he was carrying an unevenness of temperature. He entered the hospital for observation. Careful record of temperature was kept, and he was gone over from stem to gudgeon, with blood counts, smears, Wassermann, and all that long host of laboratory inquisition. Nothing was found. He replied that he never had sore throat or attacks of tonsillitis, and to the ordinary observer he had an innocent-looking pair of rather submerged tonsils. However, the anterior pillars were quite reddened and upon retracting one of them I was able to introduce a large mastoid curette into a pocket that was filled with foul septic detritus. Cleaning out this and other pockets of septic material at once relieved him of his symptoms. Later on these enormous crypts will fill again, and unless he has attention paid to them he will once more be suffering from septic absorption. Such tonsils should be enucleated.

It has been within the past decade that the true relationship between focal infection and systemic disease has been worked out. The tonsils are,

perhaps, the most frequent seat of infection of any organ of the body. It is hard at times to trace a nephritis, a rheumatism, an endo, or pericarditis, neuritis, or an hypertrophy of the thyroid to an infection in the tonsil, but nevertheless such is within the range of possibility.

It ofttimes happens that the systemic infection comes on months after an acute attack of tonsillitis, and there is no connection made between the tonsillar infection and the latent disease. To recognize these cases is often difficult and at other times easy. Retained pockets of pus, detritus in the crypts, and in the supra-tonsillar fossa and behind the pillars of the fauces, account for the periodic attacks of septic inflammation with the concurrent symptoms of systemic disease.

The submerged tonsil, the one that on cursory examination does not extend beyond the pillars, is the dangerous one. Aside from interference with breathing and phonation, the enlarged tonsil is not altogether the one to fear. In fact, the size of the tonsil has practically nothing to do with the liability to septic infection. The most innocent-looking tonsil may be the cause of periodic attacks of mild illness, with fever and general symptoms of infection.

Regarding the tonsil operation: Hudson Makuen of Philadelphia, an authority of recognized ability, says: "Few of us will doubt that the tonsil is one of the sources of systemic infection, but is there not a possible danger in the frequent reiteration of this fact?" The tonsil operation, in his opinion is already too popular. He says that some of us do the operation for the simple reason that "if we don't do it some other fellow will." Another thing that makes the operation too popular is the teaching and the information given out that the removal of tonsils is an easy matter and that it can do no harm. As to the ease with which the operation can be performed: I have time and time again heard general surgeons make the statement that they would rather remove an appendix or drain a gall bladder than remove tonsils, and yet they will go ahead and chop off a part of the tonsil, get a severe and at times almost uncontrollable hemorrhage and charge ten or fifteen dollars for their trouble. Tonsillectomy is not an operation for the office, but should be done at the hospital where one is supported by the proper surroundings for doing surgical work. When one essays to take out tonsils in one's office the result is about as follows: A child, for instance, is most improperly and tenderly held by his parent or relative. He is so arranged that his legs and arms are working in true battering-ram fashion. The patient may hold fairly still for an operator to use the guillotine and get off about one-half of the tonsil on one side and a miserable specimen of the other. The whole scene is one of confusion and disorder and the impression made, both on the patient and the observers, is one that does not redound to the surgical skill of the one who attempts tonsil work after this fashion. I know that such work is being done for I have repeated instances where little ones are brought to me for secondary operations. The report being, in most instances, that the tonsils have grown again, and this time they are to be taken out "by the roots."

In regard to the harm that may be done in this matter of the removal of tonsils: That there is harm done no one will deny. First, as to the age when one may with a clear conscience advise tonsil removal. Dr. Joseph

C. Beck has stated that he has noticed that where adenoids, and tonsils are removed in children under three years of age there is an undue amount of fat produced and the children develop in a manner that would suggest disturbance of the internal secretions. It is the accepted opinion among laryngologists that tonsils or adenoids should not be removed before the fourth year of age.

Second, when one essays to do a tonsil operation, let him be thorough with his work. Attacks on the tonsil that result in the removal only a part of the substance of the tonsil had better never have been begun. Again, I have seen throats in which the most utter disregard to normal structures had been shown. Uvula cut off, anterior and posterior pillars gone and the whole throat dry and looking as though a German 42-calibre siege gun had been somewhere in the neighborhood. Instead of a tonsillectomy having been done, it was rather a pharyngotomy.

In public speakers or singers one must be very careful in the work so that there are no constricting bands that will later alter the shape and contour of the muscles of the larynx. Again in the case of singers or public speakers, we must remember that these people have learned their art with their physical imperfection present, and if we alter this relationship, then we are apt to have a change in the tone production by reason of our surgical interference. It is by doing a clean enucleation within the capsule that we are rewarded with perfect phonation subsequent to tonsillectomy. Let us, therefore, follow the anatomical line of cleavage between the tonsillar capsule and the deeper structures; thereby placing this operation on the highest surgical plane, instead of the indiscriminate bungling that is too frequently indulged in. The models are furnished by Dr. H. C. Puckett of Warren, Ill.

Gritting the Teeth a Sign of Adenoid Vegetations.

BENJAMIN states that in 500 cases of adenoid vegetations he has encountered, gritting of the teeth at night was noted in 34.4 per cent; catarrh of the upper air passages in 46.4 per cent; disturbance in hearing in 41 per cent, and enlarged tonsils in 25.2 per cent; 31.6 per cent had enuresis. The gritting of the teeth was recorded for 45 children under 5, for 78 from 5 to 10, for 42 between 10 and 15, and for 6 between 15 and 20, and for one person over 20. Other causes may be responsible for teeth gritting in the neuropathic, but it always suggests possible adenoids.

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EDITORIALS

Dr. Stanton's Instrument for Surveying the Dental Arch.

IT HAS been our privilege to examine a number of surveys, or measurements, that Dr. Stanton has made of different dental arches with the instrument he has designed for that purpose. Those of us who have ever attempted to measure teeth in the mouth, or on the model, and make any accurate diagram of the position which they occupy, or the width of those teeth, will appreciate an instrument which will do that very accurately and much more easily than can be done with any instrument we have ever seen. It has been our privilege to study these measurements and study diagrams of the instrument, although we have never seen the instrument, but from surveys and measurements which Dr. Stanton has made, we are convinced that his instrument is far superior to anything we have had before.

The uses to which this instrument can be put will be limited only by the uses to which accurate measurements or drawings can be applied. Dr. Stanton and Mr. Rudolph Hanau, a mechanical engineer, have worked upon this plan of measuring the dental arches and perfecting the instrument since the fall of 1914. For those men practicing orthodontia who have been believers of Dr. Hawley's system of measuring the teeth and predetermining the width of the dental arch, this instrument will be a great step in advance. Although we have never believed, for various reasons which we have stated

before, that it was possible to exactly predetermine the shape of the dental arch from the measurements of the teeth, we do believe that measurements of the teeth, which are made in three dimensions, will assist in the establishment of an arch approximating the normal very accurately and will be a great advantage from a practical standpoint. In the use of the instrument, Dr. Stanton suggests making a diagram which will assist in the diagnosis of malocclusion, to show the position of the individual teeth, the relation of the teeth to the right and left side, the relation of the teeth to the median line, the antero-posterior relation of the teeth and the occluso-gingival relation. All of these positions can be accurately demonstrated, which has never been done before.

With the use of this instrument, drawings and charts can be made of the teeth, of the cusp, central fossa, and various points of the teeth, and the dental arch can be mapped out with great accuracy, which necessarily will mean that malocclusions can be much more accurately treated than they have been in the past. While some practitioners can look at a model, or a set of teeth in malocclusion, and tell practically where each tooth should be moved, a great many are not so fortunate. The measurements of the dental arch, with the drawings, will do a great deal toward improving the technic of treatment as practiced by various men.

It seems that Dr. Stanton has contributed a very valuable instrument to the orthodontic profession, and we hope he will continue his researches along this line.

Some Disputed Points in Orthodontic Treatment.

IN THIS issue of the Journal is a report of a case treated by Dr. H. G. Tanzey of Kansas City, which we cannot allow to pass unnoticed because it tends to show some of the things we have long contended for.

In speaking of the etiology of the case, Tanzey states that the early loss of the deciduous teeth was the principal factor, and we agree with him. Also, that the permanent upper molars and premolars have probably dropped forward because of the loss of approximal contact and the lower arch is distal.

We wish to call attention to Tanzey's statement that the malocclusion was caused by the loss of the deciduous teeth, for we have recently heard the assertion made by an eminent authority that the loss of the deciduous teeth did not cause malocclusion, but that most cases of malocclusion were caused by nasal obstructions. While it is a fact that nasal obstructions cause many cases of malocclusion, yet on the other hand it has also had many things charged to it that it did not produce.

We have long contended that the forces of occlusion make the most satisfactory form of retaining appliances that we could have, still few orthodontists have taken the force of the inclined plane into consideration as they should have done. Several years ago Dr. Noyes stated that the permanent retaining appliance consisted of bony spicula, which is true, but the tissues supporting the teeth depend on the normal forces of occlusion for their development. It is with a great deal of satisfaction that we notice that Dr. Tanzey recommends that the upper teeth will retain the lower ones through

occlusion. We are aware that some practitioners may encounter difficulty by depending upon the forces of occlusion because they may not be able to arrive at a proper diagnosis.

There has been some dispute in regard to the development of the mandibles in the treatment of malocclusion. By looking at Fig. 2 of the illustrations in Dr. Tanzey's case it will be seen that the mandible is underdeveloped, and by examining Fig. 4 it will be seen that the mandible has developed to its proper size.

We hope that a few more case reports like this one will convince some of the more skeptical that by the proper treatment of malocclusion, the mandibles and other bones of the face can be made to develop properly.

Dental and Medical Newspaper and Magazine Advertisers.

IT should be the duty of every ethical dentist and physician to use his influence to put a stop to the fraudulent advertiser of dental and medical service through newspaper and magazine pages. Progress has been made in this endeavor and is being made, but still there are foul birds in these professions who prey upon the credulity of the sick and those needing dental service.

The soul of some newspapers and magazines representing the best element in journalism has been touched by this profligate imposition upon the weak and afflicted and their columns are now closed to these vultures. Other publishers, however, and these represent by far the largest class, open their advertising pages to these heartless impostors.

Among the worst offenders, strange to say, can be found the religious newspaper and magazine. It may be ignorance that causes them to accept this blood money, or perhaps they need the financial returns from this class of advertising to help extend the cause for which they are battling, but it is safe to say that the gentle Nazarene who went about healing the sick and opening the eyes of the blind on the plains of Palestine would give business of this class his emphatic disapproval. It is potent to every educated man and woman that this business should be stopped. As the guardian and defenders of the weak, the strong should see to it that this imposition cease.

It can be taken for granted that every publisher of a newspaper or magazine has a family physician and dentist. Through this medium he can be effectively reached, can be convinced that he is advertising frauds of the worst character, and through this educational propaganda much good will be accomplished. Many publishers advertise for these fakers, utterly ignorant of the harm being done, to which they become a party. Once convinced of this fact they will close their columns to such a practice. To this end, physicians and dentists who practice in such families should do missionary work, and much good will come of it.

To that class of publishers, who by the lure of gold are willing to sell publicity to these public malfactors, the use of the mails should be denied. Obtaining money under false pretense through the mails is sufficient reason for being denied the use of the mails, for being arrested, fined and imprisoned. If there is any form of obtaining money more saturated by false pretense than that practiced by the quack medical advertiser and dental parlor,

it would be hard to find. Proper legislation can reduce this practice, if not abolish it entirely. Deny the great dailies of America who stoop to this practice the use of the mails and they will cease printing this form of advertisements. Use the same tactics on the magazines and they will expunge their pages of it.

To those members of the medical and dental profession who have been and are fighting for this reform, the *International Journal of Orthodontia* extends a helping hand. Our influence may be of little or no value, but such as it may gather with age can be counted upon to be against this form of fraud. Its readers represent the most progressive and enlightened element in the dental and closely allied professions. They are a power in the world's affairs. To them the journal appeals to be up and doing and help rid the country of this, the worst form of graft.

How to Make Teeth Grow Right.

PREVENTION, the modern slogan in the treatment of disease, is also the motto which characterizes the methods of today in the expert care of the teeth in the aim to forestall their degeneration and the countless number of maladies which are now known to be due to unhealthy conditions in the mouth. The connection between the two, in the light of advancing science, has become obvious, and furnishes an excellent example of the way in which various fields of knowledge formerly supposed to be fairly well separated are discovered to draw close together and even overlap as they are investigated. Consequently, the most significant department of modern dentistry may be considered to be that known as orthodontia, which concerns the treatment of the teeth and jaws in order to produce right dentition in cases where the teeth do not come together and engage with each other as they should.

Such a condition, technically known as malocclusion has been discovered to be responsible for many cases of chronic indigestion and general ill-health, due to the individual's unconscious inability to masticate food properly, as well as for various malformations of face and mouth. The treatment of this condition by drawing the teeth gradually into their correct positions has become familiar recently; and the development of this branch of the scinece is one of the most significant and hopeful undertakings of the dental colleges which are abreast of the times. It bids fair to do away with much of the tooth-decay and filling, which have formed the subjects of study in years past, through correction of the conditions that cause the bad health which is mainly responsible for tooth ills.